

water power; whereas storage below ground, excepting tanks, remains for the engineer of the future.

Since, then, the agricultural interest is an irresponsible flood producer, and makes no counter provision for the storage of the water prematurely taken out of the soil; and since existing Conservancy Boards have not the necessary powers to deal with floods; and since the claims of water supply are paramount, and, from being strongest in periods of drought, can only be met by provision from flood waters; and since again many of the subterranean water-systems are being steadily exhausted, it becomes evident that no existing authority has the powers necessary for the successful treatment of the various questions so interwoven.

Whatever shape or shapes this governing body may ultimately take, all authorities who have expressed their views upon these questions are agreed that a preliminary survey of the natural sources of supply is necessary. The collection of these essential premises to successful legislation and to successful engineering works lies within the special province of hydrogeology, which takes up the history of rain-water from the time that it touches the soil. The tangible product of the survey is a map, which shows at a glance the necessities and the capabilities of each river basin. By the execution of such a map and the mere exhibition of the facts, a great stimulus is given to engineering enterprise, and by the establishment of such a survey, as a forerunner to legislation encouraging the construction of all necessary works, and the consequent removal of the feeling of want of scope that has stood in the way of the engineer hitherto, Government will have earned the thanks of the engineering profession and of the nation at large.

JOSEPH LUCAS

THE INTRA-MERCURIAL PLANET

WE publish the following three communications in reference to the observations and calculations of Prof. Watson on the intra-Mercurial planet, about the existence of which there now seems little doubt. It will be seen from the third communication that Prof. Watson has been led to slightly alter the place of the planet from that given in the foot-note to Mr. Lockyer's article last week.

Prof. Watson, it will be remarked, refers to a second object, which he considers probably new. The position of the nearest conspicuous star ζ Cancrī, at the time of his observation, was in R.A. 8h. 5m. 14s.4, and declination $18^{\circ} 0' 9''$.

The following letter to Mr. Lockyer we referred to in the foot-note (p. 462) last week:—

*University of Michigan, Observatory, Ann Arbor,
August 14, 1878*

"Since my return I have placed the paper circles on a graduated circle, and have read off the marks made during the observations at Separation. The resulting place of Vulcan differs slightly from that which I inferred from mere estimation at the time of the observations.

"The place which I have now derived I consider to be trustworthy within $5'$ of arc. It is as follows:—

Washington Mean Time.	R.A.	Dec.
1878, July 29 ... 5h. 16m. ...	8h. 26m. 54s.	+ $18^{\circ} 16'$.

"You are already familiar with the method which I adopted. If I were to do the work over again I would use the same method. It does not give the place so accurately as it would have been given by graduated circles and verniers, but it does away entirely with the uncertainty which might be attributed to an erroneous circle reading at the time. My circles are like the chronographic record of a star transit. They give the pointings for the planet and the sun, and the readings can now be made at will.

"You will be pleased to hear that the planet was seen a few minutes afterwards by Mr. Lewis Swift, who observed in the neighbourhood of Denver. Mr. Swift is known to astronomers by his discovery of comets. I do not know whether he obtained anything more than an estimate of the position; but the place in which it is reported that he saw the planet agrees with my observation. This corroboration is peculiarly fortunate, considering the negative results of other observers.

"JAMES C. WATSON."

The following has been forwarded to us for publication by the Astronomer-Royal:—

Keswick, September 2, 1878

"I have received from Prof. James C. Watson the following communication in reference to the suspected intra-Mercurial planet:—

*University of Michigan, Observatory, Ann Arbor
August 14, 1878*

"During the recent total eclipse of the sun, I devoted myself to a search for an intra-Mercurial planet. In order to expedite the record of position, I placed disks of cardboard on the circles of the equatoreal, and marked the pointings by means of a sharp pencil and a pointer. All danger of error from wrong circle-readings is in this way avoided.

"In the course of the search, I came across a ruddy star of the $4\frac{1}{2}$ magnitude, which had a perceptible disk, the magnifying power being only 45, and which was in a position where there is no known star. It was very much brighter than θ Cancrī, which was seen a little further to the west. Its position was referred, by means of the circles, to the sun, and was as follows:—

Washington Mean Time.	Apparent α .	Apparent δ .
1878, July 29 5h. 16m.	8h. 26m. 54s.	+ $18^{\circ} 16'$

"There was no appearance of elongation such as might be expected if it were a comet, and hence I feel warranted in believing it to be an intra-Mercurial planet. The details of the observations I will send you hereafter."

"Prof. Watson's statement appears to render it very highly probable that the object seen is really an intra-Mercurial planet. I remark, however, that the reason for excluding the supposition of its possible cometary character does not seem quite conclusive, as, when the tail of a comet and the small appendages of its head are invisible, the nucleus is usually circular.

"G. B. AIRY"

The following letter to Mr. Lockyer, just received, contains Prof. Watson's latest statement on the subject:—

*University of Michigan, Observatory, Ann Arbor,
August 22, 1878*

"On account of a wrong value of the correction to be applied to Prof. Newcomb's chronometer, the place of the new star which I communicated to you last week was erroneous. Please substitute, in place of the numbers then given, the following:—

Planet — \odot	Planet's Apparent δ
$\Delta \alpha$ $\Delta \delta$	
— 8m. 21s. — $0^{\circ} 22'$	
Washington Mean Time.	Planet's Apparent δ
1878, July 29 5h. 16m. 37s.	8h. 27m. 35s. + $18^{\circ} 16'$.

"The more I consider the case the more improbable it seems to me that the second star which I observed and thought might be ζ Cancrī, was that known star. I was not certain in this case whether the wind had disturbed the telescope or not. As it had not done so in the case of any other of six pointings which I recorded, it seems

almost certain that the second was also a new star. The position comes out

And $\alpha = \odot - 27m. 18s.$ $\delta = \odot - 35'$
 Washington Mean Time. Apparent.
 α δ
 1878, July 29 5h. 17m. 46s. 8h. 8m. 38s. + 18° 3'.
 "JAMES C. WATSON"

Our Paris Correspondent writes that Admiral Mouchez has received a letter from Prof. Watson. M. Gayot has completed his calculations and finds that Prof. Watson's observations are in accordance with Dr. Lescaubault's discovery, so long denied by M. Leverrier's opponents.

GEOGRAPHICAL NOTES

THE Geographical Society of Paris took possession, on the 2nd instant, of their new hotel in the Boulevard St. Germain, No. 134. The ceremony took place at three o'clock, under the presidency of Admiral La Roncière Le Nourry, who delivered an address explaining that it was not an international congress, but merely a national meeting of the several French societies, to congratulate their eldest sister on the success which had crowned its efforts. M. Bardoux, the Minister for Public Instruction, who was seated at the right hand of the president, handed the papers of Officer of the University to the architect of the Society. He read a letter from M. de Ferri, the French consul at Zanzibar, intimating that excellent news had arrived from Abbé Debaize, the French explorer, now proceeding towards Tanganyika. The delegates of various French geographical societies afterwards gave addresses summarising the progress which has been made in the work which each is carrying on.

A MAP of France, for which a vote on account of 100,000 francs has been given by the Chambers, is being prepared by the parochial authorities on the scale of 1 to 100,000. It will be hydrographic, not orographic, levels being shown only by curves. Some of it will be issued by the beginning of next year, and two departments figure as specimens in the Exhibition. The road surveyors are to make any alterations from time to time so as to prevent its becoming obsolete. Names, railways, roads, and boundaries will be coloured black; water, blue; woods, green; and footpaths, red.

AN important and interesting discovery has just been made by Dr. A. Kirchhoff in the Library of the Halle University. It consists of a copy of a part of the original diary kept by Capt. Cook during his journey in the year 1772, beginning on July 13, 1772, and ending January 11, 1773. The volume was originally presented to the University by one of Cook's travelling companions, John Reinhold Forster, who died at Halle. Dr. Kirchhoff has communicated the contents of the volume to the Geographical Society of Halle, and proposes to compare the contents with the original diary, should the latter still exist.

M. MAYEFF, who was sent by the Russian Government for the exploration of the routes which lead through the land of Hissar and Amu-daria, has now returned to Tashkend. He has explored and surveyed the routes, 78 miles long, from Djam, a town south-west of Samarkand, to the great town Guzary; and two other routes from Guzary to the passage of the Amu river at Keliff,—one of them 98 miles long, and the other, through Shir-abad, 152 miles. The latter is the best, as there is plenty of fresh water and wood along the whole of the route, as well as two large settlements, Derbent and Ser-ob. At Keliff the Amu-daria is 1,170 feet wide, and steamers can go up the river as far as this place. There remains only 27 miles from Keliff to the Afghanistan town Akhcha, or

Andho, and no more than 80 miles of a very good route from Akhcha to Sarypul.

M. PRJVALSKY, who returned some time since from his Central Asian travels, is now preparing for a second journey to Thibet, which was postponed because of the bad state of health of the indefatigable traveller, as well as because of the insecure diplomatic relations between Russia and China.

WE learn that the St. Petersburg Geographical Society and the Society of Naturalists are preparing a scheme for the scientific exploration of the little-known parts of the Caucasus.

THE principal paper in Guido Cora's *Cosmos*, Nos. xi. and xii., is a detailed account by Eugenio Parent of his voyage to Spitzbergen in 1872-73, in the Swedish vessel the *Polhem*.

AN expedition has been organised by the proprietors of the *Queenslander* newspaper for the purpose of making a flying survey of the territory between Blackwall (Queensland) and Port Darwin, North Australia, a distance of 1,400 miles, with the view of determining the character of the country and the practicability of constructing a trans-continental railway. It was expected that the party would be fully equipped and start from Blackwall on July 12.

IT may be of interest at present to know that *Globus* is publishing the itinerary of Dr. P. Schröder's second journey in Cyprus in the spring of 1873.

AT Duisburg on Tuesday there was unveiled a memorial of Gerhardt Kremer, commonly known as "Mercator," and the author of "Mercator's Projection." Born of German parents in Flanders in 1512, he settled at Duisburg in 1552, and died there in 1594. The first stone of the monument was laid in 1869, but lack of funds delayed its completion.

BREHM'S THIERLEBEN¹

THESE three fine volumes are in continuation of those reviewed in NATURE (vol. xvii. p. 43), and for the most part they maintain the popular and scientific character of this really great popular work. A. E. Brehm contributes all that was left of the mammalia, and gives a great volume on the reptilia and amphibia. The invertebrata have been wisely placed in the hands of Oscar Schmidt, of Strassburg, the insecta having been already completed by Teschenberg. A. E. Brehm's two volumes comprise nearly 1,400 pages, and they are about the average size of those which have appeared, but the invertebrata (without the insecta) are crammed into less than 600 pages. This is the only great fault we have to find, and it appears to be chronic in every country and under every editorship. The vertebrata take up so much space that the invertebrata must be "scamped;" and the "scamping" is the result not of the editors or authors, but of the publishers. Formerly this unfortunate elaboration of the idea of "first come first served," was limited to human history, and there is a well-known "History of England" which deals largely with the remote past, and which coming to the not unimportant reign of George III. at the close of the book, summarises it with the ejaculation, "whom God preserve!" We might, in a better spirit, say God bless some one who will do justice to the vast invertebrate sub-kingdom in a popular manner.

Oscar Schmidt has had a task of great difficulty to perform in giving anything like a general view of invertebrate life; and when the enormous advance of knowledge,

¹ Die Säugethiere, vol. iii., 1877; Die Kriechthiere und Lurche, vol. i., 1878, von A. E. Brehm; and Die niederen Thiere, von Oscar Schmidt, 1878. (Leipzig: Verlag des bibliographischen Instituts.)